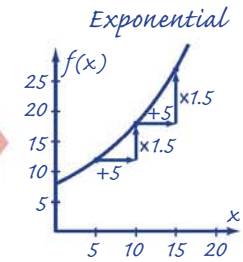
c. Exponential functions have the add–multiply property. Notice that adding 5 to x results in multiplying the corresponding $f(x)$-value by 1.5. Make a table of values ending at $x = 20$. The answer is $f(20) = 40.5$.

	x	$f(x)$	
	5	12	
+5	10	18	×1.5
+5	15	27	×1.5
+5	20	40.5	×1.5



EXAMPLE 3 ➤ Describe the effect on y of doubling x if

a. y varies directly with x.

b. y varies inversely with the square of x.

c. y varies directly with the cube of x.

SOLUTION

a. y is doubled (that is, multiplied by 2^1).

b. y is multiplied by $\frac{1}{4}$ (that is, multiplied by 2^{-2}).

c. y is multiplied by 8 (that is, multiplied by 2^3). ◄

EXAMPLE 4 ➤ Suppose that f is a direct-square power function and that $f(5) = 1000$. Find $f(20)$.

SOLUTION Because f is a power function, it has the multiply–multiply property. Express $x = 20$ as $x = 4 \cdot 5$. Multiplying x by 4 will multiply the corresponding $f(x)$-value by 4^2 because f is a direct square, so

$$f(20) = f(4 \cdot 5) = 4^2 \cdot f(5) = 16 \cdot 1000 = 16{,}000$$ ◄

EXAMPLE 5 ➤ *Radioactive Tracer Problem*: The compound 18-fluorodeoxyglucose (18-FDG) is composed of radioactive fluorine (18-F) and a sugar (deoxyglucose). It is used to trace glucose metabolism in the heart. 18-F has a half-life of about 2 h, which means that at the end of each 2-hour time period, only half of the 18-F that was there at the beginning of the time period remains. Suppose a dose of 18-FDG was injected into a patient. Let $f(x)$ be the number of *microcuries* (μCi) of 18-FDG that remains over time x, in hours, as shown in the table.

x (h)	$f(x)$ (μCi)
2	5
4	2.5
6	1.25
8	0.652

a. Find the number of microcuries that remains after 12 h.

b. Identify the pattern these data points follow. What type of function shows this pattern?

c. Why can't you use the pattern to find $f(25)$?